

WE CLAIM:

1. An elongated lighting apparatus illuminated along its entire length and capable of operation in environments subject to temperature fluctuations, said apparatus comprising:

a) at least two elongated tubular members each having two ends, each elongated tubular member having a mounting means therein, said elongated tubular members being fabricated from a material that allows the passage of light therethrough and at least one end of each elongated tubular member is an open end, wherein the elongated tubular members are aligned end to end with a region of separation therebetween and at least one open end is adjacent to the region of separation;

b) at least two substrates, each substrate having a plurality of light emitting devices thereon, at least one substrate being slidably connected to said mounting means within each of the elongated tubular members;

c) at least two end caps for sealingly engaging with the open ends of the elongated tubular members, at least one end cap having a protrusion projecting towards the region of separation, said protrusion fabricated from a material that allows the passage of light therethrough and having at least one light emitting device proximate thereto;

d) a flexible interconnector enclosing the region of separation, wherein the flexible interconnector is fabricated from a material that allows the passage of light therethrough, said flexible interconnector being illuminated by the light emitting device proximate to the protrusion; and

e) means for connecting said plurality of light emitting devices to an electrical power source for energising said light emitting devices.

2. The elongated lighting apparatus according to claim 1, wherein the protrusion has a spherical shape for dispersing illumination from the light emitting devices into the region of separation.

3. The elongated lighting apparatus according to claim 1, wherein the end caps are fabricated from a transparent material.
4. The elongated lighting apparatus according to claim 1, wherein the protrusion has integrated optics for focusing, separating or reflecting illumination generated by the light emitting devices into the region of separation.
5. The elongated lighting apparatus according to claim 1, wherein the end caps comprise an entrance aperture, an exit aperture and a conduit therebetween.
6. The elongated lighting apparatus according to claim 1, wherein the protrusion has a shape of a partial cube or octahedron.
7. The elongated lighting apparatus according to claim 1, wherein the end caps are sealing engaged to the elongated tubular members using a glue or a sealing ring.
8. The elongated lighting apparatus according to claim 1, wherein the elongated tubular members and the substrates have a radius of curvature between 1 metre and 10 metres.
9. The elongated lighting apparatus according to claim 1, wherein the mounting system of at least one elongated tubular member comprises two flanges having a groove therebetween for insertion of at least one substrate therein.
10. The elongated lighting apparatus according to claim 1, wherein the elongated tubular members comprise an external mounting feature for securing the elongated tubular members to a surface.

11. The elongated lighting apparatus according to claim 1, wherein the elongated tubular members have a cross section selected from the group comprising circular, rectangular, trapezoid or octagonal.

12. The elongated lighting apparatus according to claim 1, wherein the elongated tubular members comprise optical characteristics selected from the group comprising diffusion, refraction or reflection thereby spreading or redirecting illumination generated by the light emitting devices.

13. The elongated lighting apparatus according to claim 1, wherein the light emitting devices are arranged in a linear array on the at least two substrates.

14. The elongated lighting apparatus according to claim 1, wherein the light emitting devices are arranged in a planar array on the at least two substrates.

15. The elongated lighting apparatus according to claim 1, wherein the light emitting devices produce illumination having one or more wavelengths.

16. The elongated lighting apparatus according to claim 1, wherein the one or more substrates have a plurality of modification locations for adjustment of the length of the one or more substrates.

17. The elongated lighting apparatus according to claim 1, wherein a controller is electrically connected to the one or more substrates for controlling the illumination of the light emitting devices.

18. The elongated lighting apparatus according to claim 17, wherein the controller provides a means for sequencing illumination of the light emitting diodes.

19. The elongated lighting apparatus according to claim 17, wherein the controller provides a means for regulating illumination level provided by one or more of the light emitting diodes.

20. The elongated lighting apparatus according to claim 1, wherein the flexible interconnector has a bellow shape.

21. The elongated lighting apparatus according to claim 1, wherein the flexible interconnector is interconnected to the end caps.

22. An elongated lighting apparatus illuminated along its entire length and capable of operation in environments subject to temperature fluctuations, said apparatus comprising:

a) at least two elongated tubular members each having two ends, each elongated tubular member having a mounting means therein, said elongated tubular members being fabricated from a material that allows the passage of light therethrough and at least one end of each elongated tubular member is an open end, wherein the elongated tubular members are aligned end to end with a region of separation therebetween and at least one open end is adjacent to the region of separation;

b) at least three substrates, each substrate having a plurality of light emitting devices thereon, at least one of the elongated tubular members having at least two substrates slidably connected to said mounting means therein;

c) at least two end caps for sealingly engaging with the open ends of the elongated tubular members, at least one end cap having a protrusion projecting towards the region of separation, said protrusion fabricated from a material that allows the passage of light therethrough and having at least one light emitting device proximate thereto;

d) biasing means electrically interconnecting adjacent substrates within a single elongated tubular member, said biasing means providing a

resistive force for maintaining a light emitting device proximate to the protrusion upon thermal expansion or contraction of the apparatus;

e) a flexible interconnector enclosing the region of separation, wherein the flexible interconnector is fabricated from a material that allows the passage of light therethrough, said flexible interconnector being illuminated by the light emitting device proximate to the protrusion; and

f) means for connecting said plurality of light emitting devices to an electrical power source for energising said light emitting devices.

23. The elongated lighting apparatus according to claim 22, wherein the biasing means comprises two conductive elements and a resistive element, said conductive elements electrically interconnecting the adjacent substrates.

24. The elongated lighting apparatus according to claim 23, wherein the conductive elements each have two ends, wherein a location proximate to each end of the conductive elements is interconnected to the resistive element, thereby forcing deformation of the conductive elements to a middle region.

25. The elongated lighting apparatus according to claim 24, wherein the conductive elements have a spring shape in a middle region.

26. The elongated lighting apparatus according to claim 22, wherein the resistive element has a compressive force therein during operation.

27. The elongated lighting apparatus according to claim 22, wherein deformation of the resistive element is confined to a predetermined region.